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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,962	11/21/2001	Hidefumi Nakata	P/1071-1504	1666

7590 08/25/2004  
Keating & Bennett LLP  
10400 Eaton Place  
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Fairfax, VA 22030

EXAMINER

DIAZ, JOSE R

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/989,962	<b>Applicant(s)</b> NAKATA, HIDEFUMI	
	<b>Examiner</b> José R. Díaz	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2004.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 11 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 11 and 13-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lemnios et al. (US Pat. No. 5,162,258) in view of Azuma et al. (US Pat. No. 6,447,838 B1).

Regarding claims 1, 14 and 11, Lemnios et al. teaches an MIM capacitor comprising:

a lower electrode (85) comprising a first titanium layer, a platinum layer, a gold layer, and a second titanium layer (see Fig. 7 and col. 6, line 47)<sup>1</sup>;

an upper electrode (101) (see fig. 7); and

a dielectric layer (92) positioned between said lower electrode and said upper electrode (see fig. 7),

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<sup>1</sup> It is noted that Lemnios et al. uses the term "alloy" to describe the Ti/Pt/Au/Ti layer (see col. 6, line 47). However, the term "alloy", contrary to its ordinary meaning, is used to describe a stack of metal layers. Please note that Ti/Pt/Au/Ti includes two separated titanium layers, one adjacent to the platinum and the other adjacent to the gold. In addition, see column 6, line 5 in which Lemnios et al. discloses a multimetal layer, which includes a layer made of AuGe alloy adjacent to a nickel layer.

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However, Lemnios et al. fails to teach an insulating metal oxide layer disposed over the lower electrode. Azuma et al. teaches that it is well known in the art to include titanium oxide between a dielectric and the capacitor electrode (col. 1, lines 36-41).

Lemnios et al. and Azuma et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a titanium oxide layer disposed on the entire surface of the second titanium layer. The motivation for doing so, as is taught by Azuma et al., is protecting the capacitor electrode from the diffusion of unwanted impurities (col. 1, lines 31-41). Therefore, it would have been obvious to combine Azuma et al. with Lemnios et al. to obtain the invention of claims 1-5, 11 and 13-15.

Regarding claims 2 and 3, Lemnios et al. teaches that titanium (Ti) is one of the top metal layers of the electrode (85) (col. 6, line 47).

Regarding claim 4, Lemnios et al. teaches that the dielectric layer comprises silicon nitride (see col. 7, lines 20-22).

Regarding claim 5, Lemnios et al. teaches that the dielectric layer comprises silicon oxynitride (see col. 7, lines 20-22).

Regarding claims 13 and 15, Lemnios et al. teaches the upper electrode formed of a titanium layer, a platinum layer, and a gold layer (see col. 7, line 49).

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-5, 11 and 13-15 have been considered but are moot in view of the new ground of rejection.

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hintermaier et al. (US Pat. No. 6,605,505 B2) discloses that titanium oxide is conventionally used as an adhesion promoter layer (col. 7, lines 48-53).

### ***Correspondence***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRD  
8/10/04

  
**GEORGE ECKERT**  
**PRIMARY EXAMINER**